ILLINOIS GIS NOTES
THE NEWSLETTER OF THE ILLINOIS GIS ASSOCIATION April 2013

MAPPING FROM THE CLOUDS

April 17-18, 2013
I-Hotel & Conference Center
Champaign, Illinois

In July of 1976 the SR-71 Blackbird set a speed and altitude record of 85,069 feet traveling at or above 2,193 miles per hour. This titanium aircraft could travel from New York to London in 1 hour 54 minutes at Mach 3.2+ as the actual speed is classified. Very impressive statistics but what does this plane have to do with GIS? It was developed as a long range reconnaissance aircraft in the 1960's that was capable of carrying 3500lbs of sensors and imagery systems faster and higher than any enemy plane or missile could reach. Some of this military technology was eventually declassified and made available to the civilian market which made the imaging systems we use today more affordable. We have the capability to capture imagery for an entire county from a small plane in a couple of days on a small budget. Nothing like the SR-71's $100+ million operating budget to take pictures; even if the pictures were of an entire Country in one flight pass.

In the 1960's researchers discovered a way to send packets of data through cables. 20 years later the National Science Foundation and other private industries built the backbone of the networking technologies we use today. The Internet has no central governance but through some brilliant engineering a methodology was implemented to bring over 2.4 billion users online throughout the world. The cloud computing and networking technologies have infinitely expanded the potential uses of GIS. It is an exciting time to be in the geospatial technology field.

The theme of this Spring's Conference is intentionally a play on words as we would like to recognize more than what we can see in the sky, from a plane, in space, or as data packets streaming through our wired infrastructure. We can recognize and honor our predecessors by learning about our past and planning for a sustainable future.

We want this Spring Conference to be a celebration of the evolution of technology that has developed to meet the mapping needs of our global community.

James E. (Jim) Geringer
Wyoming Governor 1995-2003; Currently Director of Policy and Public Sector Strategies,Environmental Systems Research Institute (Esri)

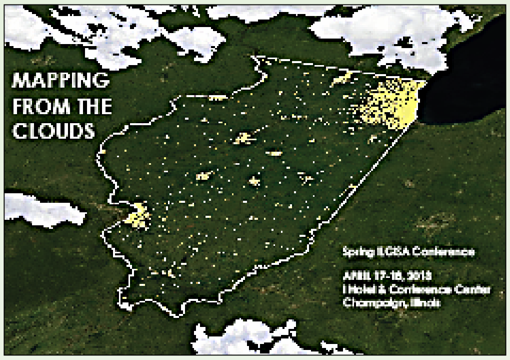
It is a privilege and an honor to have Governor Jim Geringer join us as our Keynote speaker at the Spring 2013 Conference on Thursday, April 18th. Jim was the Governor of Wyoming from 1995-2003 and currently serves as a Director for ESRI. The Illinois community sends a warm welcome to Governor Jim Geringer.

2013 ILGISA SPRING CONFERENCE
Details and Registration at

http://www.ilgisa.org/Events/upcomingconference.aspx

See Workshops and Sessions on page 13

IN THIS ISSUE



Mapping from the Clouds 1
The Nor'easter from Your President 2
To the ILGISA Community 2
Is Your GIS Education Preparing You for the GIS Job Market? 3
fyi: Copyright 4
2012 Fall Conference Summary 4
Award Winners 5
USGS CORNER: Landsat 8 (LDCM) 6
Web Map App Contest 7
The Creation of Will County Master Address Point System. 8
"What Does it Cost to Commute for Community College Students?" 10
City of Macomb Regulatory and Street Sign Inventory 12
An Improved Python Way to Get Values from One Table to Another 14

THE NOR'EASTER from your President

By Greg Johnson

I guess the Mayans were not correct in predicting the end on December 21, 2012. However, some people may have felt that December 21 may never end. Still we have survived another projected apocalypse. I, for one, am ready to make the most of another day and another year in ILGISA. This year I have some extra responsibility as your president. I look forward to meeting as many members as possible and discussing how we can guide ILGISA through the upcoming years.

As many of you may be aware, ILGISA made a small change at the beginning of 2013. We moved our office. You can read this link to review my letter from last month. I remember attending my first GIS in Illinois conference back in early 1990s at the Arlington Park Hilton in Arlington Heights. Little did I know that group of my peers and colleagues would become a 550 plus member, statewide organization in 20 years. The Center for Governmental Studies staff at Northern Illinois University has guided ILGISA through the years to fulfill our mission. I want to extend my thanks and gratitude for the decades of service to our association.

As with any new year, we have a couple ways for you to take advantage of your membership in ILGISA. First, what you are reading now, *GIS Notes*. This issue has several good articles about local projects, work techniques, and an interesting student analysis. Second, the Spring Conference is only a few weeks away, April 17-18 at the I Hotel in Champaign. Presentation, poster and workshop submissions are getting finalized at the time of this writing. The conference planning committee has been working hard to make this year's conference top notch. Third, we are accepting your submissions to present a webinar to share your experiences with your peers. Webinars allow any member to learn in more detail about the presenter's topic without needing to leave your office. Finally, we still have a couple ILGISA committees that you could use your input. I encourage all of you to do any or all of these tasks while you are a member of our state GIS association. Together Everyone Achieves More!

TO THE ILGISA COMMUNITY

My name is Keisuke Nozaki and I am the new editor of *GIS Notes*. I am a currently the GIS specialist for the Western Illinois University GIS Center. I became a member of the ILGISA Board in October of 2012, and was soon elected as the chair of the Publications Committee. By actively assisting with the conference planning, education, and publications committee, I had the opportunity to learn about history of ILGISA, and the many accomplishments which it has achieved. I believe a semiannual newsletter would be a great way to share important information with the ILGISA community. I would like to use my knowledge I've gained as an editor of GIS Notes to enhance both the informative and technical aspects of our newsletter. I will continuously seek out information regarding new projects and input from the GIS community. In addition to committee news, I am eager to include maps and programming codes that are contributed from ILGISA members. I would like to thank you for your support and I always welcome and appreciate your suggestions or comments regarding GIS Notes.

Sincerely,

Keisuke Nozaki

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IS YOUR GIS EDUCATION PREPARING YOU FOR THE GIS JOB MARKET?

By Todd J. Schuble

Comprehensive GIS education programs are rare. Many colleges and universities claim to "certify" you in GIS. However, when browsing GIS job postings or going on job interviews, do you feel qualified and confident in your GIS skills or do you feel inferior? Everyone can be a well-rounded GIS candidate given enough time and money for education but not everyone has those luxuries.

Some GIS education programs out there can definitely leave you wanting or needing more to stay competitive in a very tight GIS job market. You need to carry a heavy skill set in order to have a shot at landing the GIS job opportunities that do exist. Unfortunately, GIS concepts with the steepest learning curves are often not covered in many GIS education programs. High level spatial analysis and spatial statistics, GIS software development for mobile or web environments, and GIS software diversification are where students or even regular GIS practitioners are looking for the most help but receiving the least amount of assistance.

Smaller GIS education and certification programs will teach you when to use a State Plane projection system, how to execute a buffer function in ArcGIS Desktop, and give you an introduction to Python programming if you are lucky. Other than that, you need to seek out those comprehensive GIS education programs mentioned earlier that often take years to complete.

So if your time, mobility, and finances are limited, what can you do to help yourself and stay competitive? You have no choice but to become self-taught. There are more resources on the Internet than you think. You just have to know where to look. There is also an ancient institution with tons of information that is rarely used anymore. Many refer to them as libraries. Finally, if you own your own computer and are willing to install the keys to your future, then you are ready to get started on your very own GIS curriculum.

Learning software or software development may seem difficult if you do not have the money for software licenses. No need to worry. Free software is readily available. ESRI will give you a free copy of ArcGIS Desktop good for 60 days. Pitney Bowes will give you a free copy of MapInfo Professional for 30 days. Quantum GIS is a free and open source GIS software. uDig is another free and open source GIS desktop software. A good Google search will do you some good in finding all kinds of freebies on the Internet in many different ways.

How about GIS web development? If you want to implement your own GIS web server, MapServer and GeoServer are both free and open source software to use. If you do not have a server readily available, no problem. Amazon Web Services costs dollars a month for you to set up and host your own GIS web server. What about using the GIS Cloud to serve out your data? ESRI will give you a 30 day trial of ArcGIS Online. GeoCommons is totally free to use.

Mobile development is growing in demand since businesses and institutions want to geolocate you, no matter where you are. Try developing apps for the iPhone or Android platforms. If a 7th grader can do it, you can too. You just need an idea for what sort of data you want to capture. Buzztouch is a good place to start you along the mobile development process if you need to emulate iPhone or Android in a web environment. You can also use Eclipse as a free development platform.

All these free alternatives may seem great but without knowing how to use the software or write computer code, they will not do you any good. Do a Google search on "ArcGIS Online tutorials" or "MapServer tutorials" or "Android development tutorials" or any combination of the software/platform names mentioned above along with "tutorial", "textbook", "education", etc. Your searches should return a good amount of free resources that you can use. Many tutorials are online or in video form. If a training guide or textbook is only available in print, head to the library. If your local library does not have the book, they can likely order it for you.

When it comes to textbooks, these serve as the guides for many GIS curriculums. Many GIS textbooks are full of tutorials and examples that you can work through on your own. The question is which textbooks you should choose to read. Once again, Google is your friend. Search for GIS class syllabuses online from different colleges and universities with comprehensive GIS programs. Which textbooks are being used the most? If you want to be a bit more bold, email the professor of a particular class and say that you are considering enrolling in their GIS program but you would like to take a look at their syllabus first if available. Also, some faculty post their exercises or lab assignments online. You may not have access to the data that was used but you might get a look at the steps you need to execute a GIS procedure or to learn a new spatial analysis method.

If your GIS degree or certificate still leaves you wanting more, there are alternatives. However, no one said this was going to be easy. It will take a lot of work on your part but it will pay off and in the meantime you will increase your skill set. Do you really have a choice in the matter when looking for a GIS job in a competitive market? If you are running a marathon against a competitor that you know is better and faster than you, do you just give up? Or do you simply try as hard as you can to run faster? You make the choice.

FYI: COPYRIGHT

by Jeff Palmer

Can we copyright geo-spatial data?

We tend to use the term "data" and "information" interchangeably. We have to be very careful about our vocabulary and how we use the terms. In essence, "information" is formatted data.

Format(data) = information

Note that you have to do something to the data before it becomes information. This concept is critical to answering the above question correctly.

Section 8 of the US Constitution gives Congress the duty … "

> *To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries…"*[i]

Protecting the Authors' exclusive rights falls to the Library of Congress in title 17 of the US Code, *"… to the authors of 'original works of authorship,' includingliterary, dramatic, musical, artistic, and certain other intellectual works. This protection is available to both published and unpublished works. Section 106 of the 1976 Copyright Act generally gives the owner of copyright the exclusive right to do and to authorize others to do…"*[ii]

Can we copyright data?

Like so many other issues we have to turn to the courts for a ruling, an interpretation of our Founders' thoughts. But before we go to court, imagine the amount of data our Founders had to deal with compared to the vast bank of data at our fingertips.

How would you rule?

Feist Publications, Inc., v. Rural Telephone Service Co., 499 U.S. 340 (1991), commonly called Feist v. Rural.

In summary: Feist published a phone book of names, addresses and telephone numbers. The Telephone Company sued for copyright infringement.

The court found that you CAN NOT copyright facts (data) and added that some creativity must be involved to make something copyrightable. So the ownership of the formatted data falls to the Publisher not to the Telephone Company[iii]. Or as Sheldon Copper of the Big Bang Theory would say, "Buzinga![iv]"

Copyright is only one of the many constructs where a working knowledge is required and is only one of the many skills that make up our critical thinking abilities.

Jeff Palmer is a Training & Development Specialist at Learning & Technical Strategies, Inc. and can be reached at askjeff@LTS2Enable.US

2012 FALL CONFERENCE SUMMARY

The Fall 2012 conference, with over 300 in attendance, offered a range of sessions for all levels of GIS professionals. The theme, "Transforming GIS into Knowledge", rang true as the conference emphasized how to communicate the information in a map, but also, how to effectively communicate with colleagues and C-level executives. The inspirational message from the keynote speaker, Ret. Col. Jill Morganthaler, taught us success is built on communities like ILGISA and its strength comes from the growth and active participation of the membership. She challenged everyone in the room to bring a colleague to the Fall 2013 conference. Will you take that challenge?

We need feedback! The Fall Conference Committee tried a number of new concepts such as the mobile conference app, free popcorn and showing movies from the GeoSpatial Revolution in the new GeoLounge, the Vendor Product Showcase, and the Special Interest User Groups. Tell us what you want to see again or not. Be a part of the conference and make the most out of your membership by volunteering on the committee. Your direct input will help guide the organization into the future.

2013 ILGISA PUBLICATIONS COMMITTEE

Keisuke Nozaki *(Chair)*

Greg Johnson *(President)*

John Kostelnick

Andy Parer

Micah Williamson

HILTON DISTINGUISHED COLLABORATION AWARD WINNER

Alan Hobscheid, Cook County GIS

Alan Hobscheid has been involved with GIS for Cook County since the late 1980s, and has been managing their GIS operations since the mid 1990s. He has successfully collaborated with various departments in Cook County to strengthen their use of geospatial technology. In 2003 Cook County received the Special Achievement in GIS (SAG) award from Esri. Alan has actively participated in the Northeastern Illinois County GIS Cooperative Program since its inception in 2005. Over the past four years he has taken the lead in acquiring six inch, color infrared orthophotography for the seven northeastern Illinois counties. This photography provides a seamless base layer for the counties within this program. He has contributed to several articles for ILGISA GIS Notes, Esri ArcNews, and several other geospatial technology periodicals. Alan has also taught several geography classes at Roosevelt University since 1999 and has used his talents to advance geospatial technology throughout the state.

DAHLBERG DISTINGUISHED ACHIEVEMENT AWARD WINNER

Patrick McHaffie, PhD, DePaul University Department of Geography

Patrick McHaffie has been a faculty member in the Department of Geography at DePaul University since 1996. Pat has been integral in developing undergraduate courses that utilize GIS, and led DePaul to establish an undergraduate BA Geography degree with a concentration in Geotechnology, and a Certificate in GIS. In 2007 he was one of a group of faculty that initiated a project in Kenya working with the Green Belt Movement (GBM) as part of DePaul's Study Abroad Program. He proposed using GIS to assist in the GBM's efforts to map vegetation and plant. This experience was eventually offered to DePaul students in December 2009. Since then, he has successfully led 41 DePaul students to Kenya to collaborate on GIS projects with local Kenyan organizations. Pat has been a tireless advocate for GIS in Illinois has promoted and encouraged greater awareness and usage of GIS

2013 ILGISA OUTSTANDING STUDENT AWARD RECIPIENT ANNOUNCED

Jane Bartman was nominated by Todd Schuble, University of Chicago. In addition to being a former student, Jane also worked with Todd as a GIS Research Assistant in the Social Sciences Computing Services department. He reports that, "She also likes having a full understanding of how the analytical software being used was installed, works, could be customized, etc. Her quantitative and analytical capabilities along with her ability to work independently and produce excellent results are qualities that anyone would hope for in a research assistant. Her keen attention to detail, willingness to help, and general understanding of spatial analysis and GIS were exactly what I look for in someone to assist me with GIS projects. She has assisted on projects ranging from facilities management to epidemiology to demographics and completed all of them with nothing less than perfection."

Derek Bus was nominated by Andrew J. Krmenec of the Northern Illinois University Department of Geography. Dr. Krmenec reports that, "Derek is the epitome of a high aspirations, high achieving student. . . Besides being a strong student, Derek is also a leader in the classroom. In fact, he was chosen by the department this year to serve as our undergraduate representative to the College of Liberal Arts & Sciences, Student Advisory Committee…This past summer, as a sophomore/junior, he interned with the Water Science Division of the USGS as a cartographic aide. Derek's internship supervisor reports that his background knowledge and skills were excellent and that he demonstrated the same resolve to excel there as he does in the classroom. It is my understanding that Derek is pursuing an additional internship experience for this coming summer, with a focus more on GIS and urban planning. Given his academic performance, leadership skills, and personal resolve, we expect Derek to be successful with this internship as well as in a career field utilizing his background and interests in geography and GIS."

Michael Jersha was nominated by the faculty of the Department of Geography at DePaul University, who summarized their nomination saying, "Mike Jersha is a dedicated, hard-working and focused undergraduate GIS student at DePaul. His work in the past four years has demonstrated not only technical skills but also strong written and verbal communication skills, and a great work ethic. He has demonstrated his excellence in GIS through his work with students, faculty, and community groups, both inside and outside the classroom. With a commitment to using GIS to highlight social inequalities and advance analyses of poverty, DePaul's Department of Geography faculty members highly recommend Michael Jersha for an ILGISA Outstanding Undergraduate Student Award."

Join us at the ILGISA SPRING CONFERENCE to congratulate the Outstanding Student Award Recipients

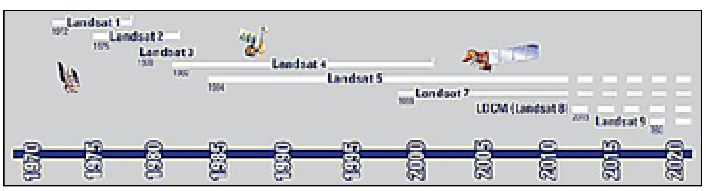
USGS CORNER
Landsat 8 (LDCM)

Written by Shelley Silch

The Landsat era that began in 1972 will carry on with the successful launch of the Landsat Data Continuity Mission (LDCM) in February 2013. Global, synoptic, and repetitive coverage of the Earth's land surfaces will continue at a scale where natural and human-induced changes can be detected, differentiated, characterized, and monitored over time. LDCM is a partnership between NASA and the USGS.

NASA will host a two-day event for 80 of its social media followers on Sunday, Feb. 10, and Monday, Feb. 11, at Vandenberg Air Force Base in Lompoc, Calif., for the launch of the Landsat Data Continuity Mission, a satellite that continues a record-breaking 40 years of Earth observations.

Landsat satellites provide the longest continuous global record of the Earth's surface – ever. The first Landsat satellite



launched from Vandenberg in 1972 and now what will become the eighth satellite in the Landsat series is scheduled to also launch from Vandenberg. This satellite, the LDCM, continues Landsat's critical role in monitoring, understanding and managing our resources of food, water and forests.

A collaboration between NASA and the U.S. Geological Survey (USGS), the Landsat program provides data that shows the impact of human society on the planet - a crucial measure as our population surpasses seven billion people. Landsat data has, over time, led to the improvement of human and biodiversity health, energy and water management, urban planning, disaster recovery and agriculture monitoring, all resulting in incalculable benefits to the U.S. and world economy.

LDCM will join the aging Landsat 5 and Landsat 7 satellites in orbit to produce stunning images of Earth's surface along with a wealth of scientific data.

Soon after launch, approximately 400 scenes will be acquired each day by the LDCM and archived at the USGS EROS Center. All scenes will be processed to Level-1 products, consistent with current standard Landsat data products. LDCM scenes will be available for download within 24 hours of reception and archiving.

LDCM will carry two pushbroom sensors: Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS). The OLI will collect data in nine shortwave bands - eight spectral bands at 30-meter resolution, and one panchromatic band at 15 meters. Refined heritage bands addition of a new coastal/aerosol band, as well as a new cirrus band will create data products with improved radiometric performance. The TIRS will capture data in two long-wave thermal bands with a minimum of 100 meter resolution, but will be registered to and delivered with the OLI data product.

A new Quality Assurance band will also be included with each data product. This will provide information on the presence of features such as clouds, water, and snow. Details on the LDCM Band Designations can be found on the Band Designation page.

The LDCM data product file size will be significantly larger than existing Landsat data products, due to greater radiometric quantization, increased number of bands, and the addition of a Quality Assurance band.

Sensor Information

Operational Land Imager (OLI)

- Nine spectral bands, including a pan band:
  - Band 1 Visible (0.433 - 0.453 µm) 30 m
  - Band 2 Visible (0.450 - 0.515 µm) 30 m
  - Band 3 Visible (0.525 - 0.600 µm) 30 m
  - Band 4 Near-Infrared (0.630 - 0.680 µm) 30 m
  - Band 5 Near-Infrared (0.845 - 0.885 µm) 30 m
  - Band 6 SWIR 1(1.560 - 1.660 µm) 30 m
  - Band 7 SWIR 2 (2.100 - 2.300 µm) 30 m
  - Band 8 Panchromatic (PAN) (0.500 - 0.680 µm) 15 m
  - Band 9 Cirrus (1.360 - 1.390 µm) 30 m

Thermal Infrared Sensor (TIRS)

- Two spectral bands:
  - Band 10 TIRS 1 (10.3 - 11.3 µm) 100 m
  - Band 11 TIRS 2 (11.5 - 12.5 µm) 100 m

WEB MAP APP CONTEST

The ILGISA Education Committee is pleased to announce the winners of the Web Map App Contest:

Kane County Interactive GIS Online Maps

Champaign County GIS Webmap

As part of the 2012 service project, the ILGISA Education Committee is working with children's museums in Illinois to develop a GIS related display for public viewing. The goal of the display is to educate children about the value of GIS via an interactive museum display. ILGISA Web Map Apps will demonstrate to children how GIS can make a difference!

The Committee announced the ILGISA Web Map App Contest last fall and reviewed entries based on originality, creativity, overall design and aesthetics and ability to communicate to children.

Kane County Interactive GIS Online Maps

Primary Contact: Thomas Nicoski, Chief of GIS-Technologies
Organization: Kane County Illinois GIS-Technologies

Use these maps provided by GIS Technologies to search for locations by either address, parcel, district, polling place, forest preserve, municipality, or county facility.

Map App URL: http://gistech.countyofkane.org/kanegis/kanegis.html

Champaign County GIS Webmap

Primary Contact: Tom Laue, GIS Technician
Organization: Champaign County GIS Consortium

This is mapping interface is specifically designed to display parcel based information for assessment purposes. Users can click the arrow at the top of the right pane for searching options to find a specific parcel of land by address or PIN. The resulting attributes will display in that pane while the map zooms to the specified parcel. The webmap results tab includes links to the assessor and treasurer's office pages for that parcel, and their webpages for each parcel link back to the map. Aerial photos can be turned on from the Base Map button and transparency levels may be adjusted to see the underlying layers better. Other data layers which may be turned on via the Layers button are political boundaries, topology, flood zones, Census 2010, and township boundaries.

Webmap users may measure and draw on the map and then export the map to a pdf or jpg for printing or inclusion in other documents. The webmap references our live SDE connection such that as the technicians make updates to the data, the map is automatically updated the following day. Having the webmap is beneficial as it saves staff time from having to individually look up this information when requests come in from the public, people in the assessment and real estate fields, flood insurance companies, etc. and is more convenient for those users. The map was designed to resemble the layout of Google maps as people are familiar with viewing maps in this is format.

Map App URL: http://www.maps.ccgisc.org/

Cook County Clerk's Office GIS Manager Tanya Anthofer and GIS Analyst Intern Robert Sameh are creating thematic displays of tax delinquent parcels for Cook County's Department of Economic Development in an effort to assist local municipalities in restoration initiatives

CONGRATULATIONS TO NEW GISP'S!

Congratulations to the following members who have obtained their GISP Certification since September 2012:

- Jonathan J. Hodel, President, Cloudpoint Geographics
- Yi-Sz Lin, Assistant Professor, University of Illinois at Springfield
- Patrick McHaffie, Associate Professor, Dept. of Geography, DePaul University
- Adam Williams, GIS Coordinator, Village of Northbrook

THE CREATION OF WILL COUNTY MASTER ADDRESS POINT SYSTEM

Author Tong Zhou, Director, Will County GIS

Many departments and agencies in Will County use addresses in their daily services to the general public. Those services include dispatching 911 emergency calls, providing timely disaster assistance, tracking diseases, validating voter registrations, deciding land use and zoning cases, fighting crimes, and etc. Over the years, some departments built up their own address databases through their interactions with the residents using various paper application forms, commercial sources, sources from municipalities, and through the county's addressing authority for the unincorporated areas. County functions were handled by many different departments and were connected by very different mechanisms. Therefore, the respective address databases were scattered around various departments and were in different file formats and database structures. Some were only available on paper. Many had not been checked for accuracy so they were not reliable, or included errors that had accumulated over the years. These databases were unable to be linked to each other due to the lack of common formats. Most importantly, none of them had an one to one spatial relationship between an address and the property of that address. Since so many critical functions of county government require precise address and location information, the need to have an accurate and point-based single address system, capable of pinpointing exact locations, was greater than ever.

In the summer of 2007, after a series of stakeholder meetings involving multiple departments, a project plan was established and a pilot program to test the procedure was begun. In the summer of 2008, the project was formally launched after additional improvements were made to the procedure and agreed upon by key players. By early 2012, the Will County Master Address System that contains almost 400,000 address points was built and put into use.

The GIS department, working with 911, went through the following phases in developing the system:

a. **Project preparation**

During this phase, input was gathered from all the stakeholders and a procedure of address checking was established with enough safeguards to minimize the possibility of human errors. A data structure for the system was established that took into account the various addressing standards on the local and federal levels.

b. **Pilot program**

After all the preparation was completed, a pilot phase was conducted for the project to test out the procedure, the data structure, and all the things identified as key to the project. Staff began with a small township with about 6,000 addresses. During the pilot phase, GIS staff became familiar with the procedure and the editing tasks in the software specific for address checking. Clear coordination and communication between the GIS department and 911 were established to facilitate the process. The GIS department was in charge of the main task of creating and moving address points, checking and correcting address and PIN attribute values, documenting editing history, and QA/QC initial results. The 911 staff was responsible for the second round of QA/QC and merging the approved results into the system. Staff at 911 were also in charge of adding and correcting new address points from current developments for the system so the system was always up to date. This helped avoid previous mistakes of accumulating new errors while correcting old errors. During this phase the work procedure and the data structure were both improved to address issues not thought of earlier.

c. **Formal development of the system**

In the summer of 2008, County staff started to formally develop the Will County Address Point System after completion of the pilot program. The pilot program provided much needed experience on how to build the system the right way. With the understanding that accuracy and the thoroughness was the key to the success of the project, it was decided to build the system in a systematic and comprehensive way.

Will County has 24 townships. Most of the townships are squares at the size of 6 miles by 6 miles. GIS staff further divided those townships into 36 1 mile by 1 mile sections as the basic system building unit. They went through section by section. In each section, they went through each parcel in that section and performed the following steps on that parcel:

- Make sure that an address point was created for a single parcel with one address;
- Make sure that the correct number of address points had been created for the corresponding number of duplicate and overlapping parcels due to the existence of buildings with unit numbers within the parcel;
- Check the addresses associated with those address points against multiple sources mentioned earlier to make sure that the addresses were correct and the unit numbers of the addresses were correct too;
- Check the addresses against those of the street centerlines and make

corrections;

- Using the latest aerial imagery as background, move the address points to the right locations on the building, usually the main entrance of the property, or to the center of the parcel if it was vacant and note "V" in the field of "House Number";
- Put in any information in the database detailing the history of an editing session so that any mistakes could be traced back and corrected in the future;
- After all the address points in all the sections in one township were reviewed and the above steps were completed, that township was further processed in the following QA/QC procedure:
- In order to minimize human errors and speed up the process, GIS staff developed some desktop tools and scripts. One of the tools was called PIN Checker. It was used to check for any PIN errors associated with the address points after all the address points in one township were cleaned. The tool was designed to make sure every address point had a unique PIN corresponding to the PIN of the underlying parcel. Any incorrect, missing, extra, or questionable PINs were selected out into a text file. Then the editor used this file to research those errors and correct them accordingly in either the address point system or the tax parcel layer or both.
- Then the address points of the whole township were checked against the County Clerk's voter registration file. Any discrepancies would be researched and errors would be corrected.
- Next, the completed township and the respective address points were sent to the 911 staff for a second round of QA/QC with an independent set of eyes and additional local knowledge from the 911 staff's perspective. These staff would use visual inspection on hardcopy maps, database sorting, random checks, PIN checker, help from local firefighters and other measures to make sure everything was correct.
- Once the address points of the township received approval, they were added into the final address point system. The system resided in the servers of both 911 and GIS department with data replication set up between them.

All 24 townships went through the vigorous review process. In early 2012, staff completed the project and almost 400,000 address points from the 24 townships were added into the system. During the time of building the system, 911 staff continued to maintain the address points from current land developments. So when the system was built, it not only included the address points before the project started, but also included the address points created during the project timeframe. The system will continue to grow in real time with 911 being the office responsible to maintain the data going forward.

The Will County Master Address Point System is now the foundation for address databases and location information in use by all county departments and agencies. It has greatly improved accuracy and reduced the staff time needed to answer calls regarding addressing errors. The point-based feature makes pinpointing locations possible and shortens the response time of emergency crews. Since this address point system was built for use countywide, it makes the integration of the system into other county systems easier. It has improved the efficiency and effectiveness of the County's delivery of public services in a number of ways.

As a result of the success of the Will County Master Address Point System, Will County won the 2012 ESIG Distinguished System Award from URISA. It was an honor to be recognized by your peers and it will encourage us to provide even better services to county departments and the general public using the power of GIS.

ILGISA WELCOMES NEW STUDENT MEMBERS:

Ernesto Barahona, University of Illinois at Urbana Champaign

Nicholas DiStasio, Eastern Illinois University

Trisha Rentschler, Eastern Illinois University

Noah Sager, Chicago State University

Adam Schimmelpfenning, Eastern Illinois University

Kushendra Shah, Southern Illinois University Carbondale

Angela Spinasanta, Northeastern Illinois University

"WHAT DOES IT COST TO COMMUTE FOR COMMUNITY COLLEGE STUDENTS?"

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Introduction

The purpose of this study was to use geospatial techniques and to estimate the cost for community college students in a large rural district in Illinois. Many past studies have confirmed that commuting cost is one of the larger elements driving the cost to attend commuter campuses like community colleges. This study attempted to estimate this cost against the backdrop of one of the larger community college districts in area in Illinois (Figure 1).

Geographically, Lake Land College serves a large rural and low population density region in East-Central, IL. This area, which is close to 4000 square mile, represents an area close to the combined area of the states of Rhode Island and Delaware. This expansive area represents a potential barrier to college students in accessing the college through longer commutes. This study attempts to measure through geospatial techniques how commuting distances and cost can shape real world decisions in how students access higher education in Illinois. Using these findings can help, or at least introduce, visualizations of how distance decay can be modeled using geospatial analysis. At what point does distance impact how far a customer, student, patient, or employee is willing to commute?

Methods

The primary data set for this study was the Lake Land College student registration database for the fall 2012 semester. Using ArcGIS Business Analyst, the records were geocoded and spatially referenced against the backdrop of background data sets like county, street, and community college district layers. Modeling student commuting patterns is very complex and difficult. Student diversity relating to age, gender, and lifestyle complicate the process of modeling commuting patterns. In addition, the process of modeling student car fuel efficiency and the cost of fuel also complicates the process of estimating student commuting cost. Using background research and references the following table represents a summary of the estimates and assumptions used to calculate energy usage/cost for college students at Lake Land College.

Figure 1. Illinois Community College Districts

Table 1. Research Assumptions for Estimating Student Commuting Cost

Assumption	Estimate Rationale
Students travel or commute to campus three times a week	Geospatial analysis will use spider diagrams to assign students to main campus or closest LLC campus in estimating commuting patterns
Car fuel efficiency was modeled 21 mpg and 15 mpg	References indicated the average American is commuting in a ten to eleven year old car. The research modeled the average car and truck highway mpg for 2002 models.
The average fuel cost was set at $3.55/gallon	Using regional fuel estimates for local gas stations this number reflects the average cost of gas in East-Central, IL for 2012.
Only students living within 15 miles of LLC District were included within the study	Student living outside of 15 miles of the LLC District are not likely commuter students.

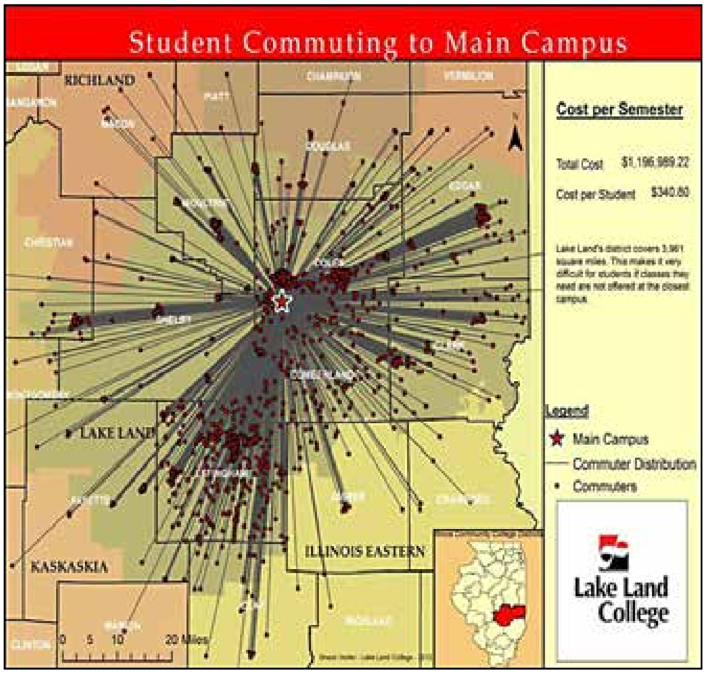


Figure 2. LLC Students to Main Campus in Mattoon, IL

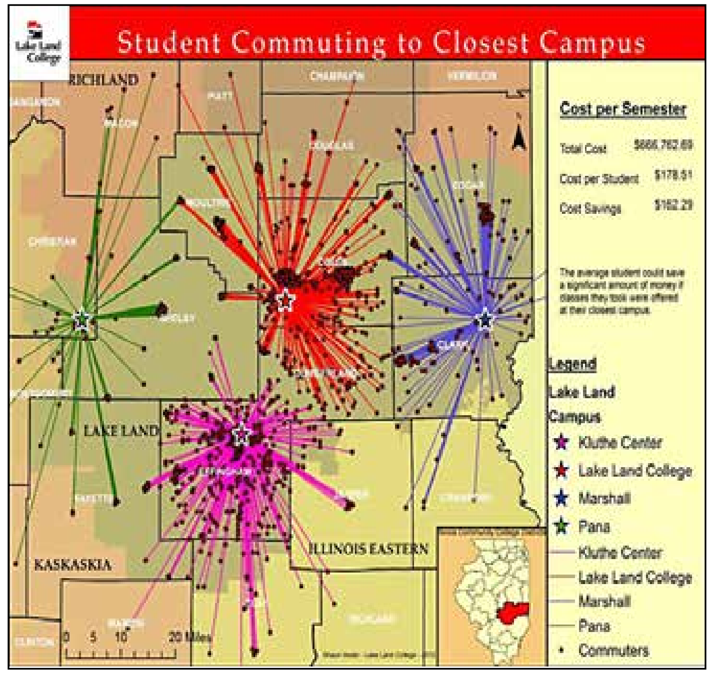


Figure 3. LLC Students Commuting to Closet LLC Campus

Results

Findings indicate that in LLC's district that community college students experience extensive demands on commuting to the college's main campus location in Mattoon, IL (Figures 2-3)

These findings indicate the extensive cost associated with commuting in a large community college district. Students traveling to main campus in Mattoon, IL indicate a cost of $340.00/semester (Figure 2). One model to address these challenges relates to the development of extension campuses across the district (Figure 3). LLC has built a number of campuses in Effingham, Pana, and Marshall, IL in addressing these historic challenges of costly commutes. As indicated with this research significant cost savings could be gained by assigning students to the closest campus (Figure 3). Cost saving estimates from this approach could reduce student commuting cost from $340.00 to $178.00 per semester. These savings would equal almost two credit hours of tuition on campus.

Discussion

This paper serves as a potential model in producing discussions on the application of geospatial analysis to institutional research in higher education. In addition, the researchers want to highlight the potential of using these techniques to any business or industry interested in how commuting cost, distance,

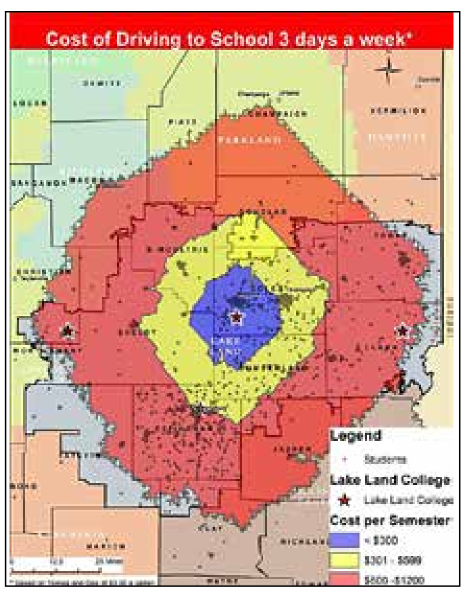


Figure 4. Trade Area Map for Estimating the Area at Which Commuting Cost Double Tuition

and energy usage impact the day to day behavior of consumers. Numerous applications and questions still exist within this study at Lake Land College. Future research is currently targeting questions relating to online education. At what point does commuting cost double the cost of tuition, and in turn, promote the viability of leveraging online courses to reduce cost (Figure 5).

This analysis, which is modeled on low vehicle fuel efficiency and high gas prices, indicates the "true" functional region for the College's market (Figure 4). Any student commuting to Mattoon outside the red trade area above is doubling their tuition in transportation cost. The applications and potential usage of geospatial analysis with addressing institutional research in higher education is extensive. This study serves as one model in how this type of visualization can help colleges' better serve students through reducing cost. The authors look forward to any feedback, questions, and potential critiques on the study from other researcher and geospatial technology professionals.

CITY OF MACOMB REGULATORY AND STREET SIGN INVENTORY

Keisuke Nozaki, GIS Specialist
Western Illinois University GIS Center

Introduction

The Western Illinois University (WIU) GIS Center mapped regulatory and street signs on city owned streets for the Macomb Public Works Department (MPWD). It is important for them to know the locations of their signs and to be able to identify which signs need to be repaired or replaced. The WIU GIS Center is notified by the MPWD of any updates that need to take place within this dataset. These changes are then integrated into the GIS database maintained by the WIU GIS Center.

Methods

Due to the portability of the equipment, a mapping grade GPS (Trimble GeoXT with Recon) was selected for this project. A survey grade GPS (Leica 1200) was another option, but the city did not request the accuracy that Leica 1200 would produce. A data dictionary was created using Trimble Pathfinder Office Software. It was very useful to create a drop down list to minimize data entry errors. The following attributes were stored in TerraSync Software while collecting GPS coordinates:

- Point ID
- Support ID
- MUTCD Code
- Information
- Traffic Direction
- Width
- Height
- Mounting Height
- Support
- Offset
- Sheeting Material
- Support Type
- Inspection
- Notes

Point ID is an auto increment that gives a unique number for each sign. Support ID indicates a unique ID for each sign post. For example, one post may contain multiple signs (which is one to many relationship). MUTCD (Manual on Uniform Traffic Control Devices) Codes, defined by U.S. Department of Transpiration, provide a standard sign code which is available at http://mutcd.fhwa.dot.gov. For example, MUCTD Code for a no parking sign is R7-1, but the time or day is a variable. Additional information such as "6am to 6pm" or "Mon to Fri" were included in the Information field. Traffic direction indicates which direction a sign is facing (N, S, E, and W). The width and height of the sign was measured in inches by a tape measure. For convenience, we set a default size to 12" x 18". Additionally, mounting height and support offset were measured in inches (Fig. 1).

Sheeting materials are classified into three categories: engineer grade, high intensity grade, and diamond grade VIP. Support type is usually either square steel or U-channel. In rare cases, signs were attached to the wood post or other objects. We also inspected condition of signs and took notes if necessary.

Challenges

There were several challenges on this project. First, we came across a number of custom signs which are not listed in the MUTCD Code. The best way to address this situation was to select "Other" in the drop down list and describe the sign in the Notes field. If these unlisted signs are relatively common throughout Macomb, we created our own code such as GW-1 (which is GoWest Transit Bus Stop Sign). Another challenge was that under many trees, satellite reception was poor. Under these circumstances, it was sometimes necessary to shift the signs using aerial photos from the office. There was also an unexpected issue that arose when a vendor which the MPWD purchased from uses different sign codes from the MUTCD Code. To solve this issue, a comparison table between vendor codes and MUTCD Codes was created. This project also gave us the opportunity to notify the MPWD if any outdated or damaged signs were found in the field. These were put into a list and would be addressed for repair or replacement.

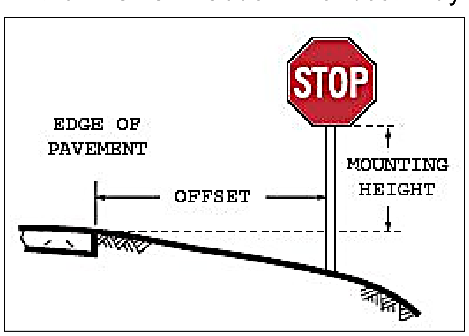


Figure 1. Mounting Height and Support Offset

Future Improvements

There could be a number of ways to improve this type of project in the future. One way would be to ride bicycles. If the equipment can be easily transported, this may be a much more efficient method to collect data than walking. Measuring mounting height and support offset took more time than expected. If they are unnecessary, it may speed up the process. If manpower is available, two teams may collect data at the same time. However, it is important to take an extra precaution to avoid overlapping. To prevent double-logging at any given intersection, we decided to collect street signs only when walking from west to east. It was discovered that it is more efficient to collect points on both side of the street for low density areas, but only on one side of the streets for high density areas.

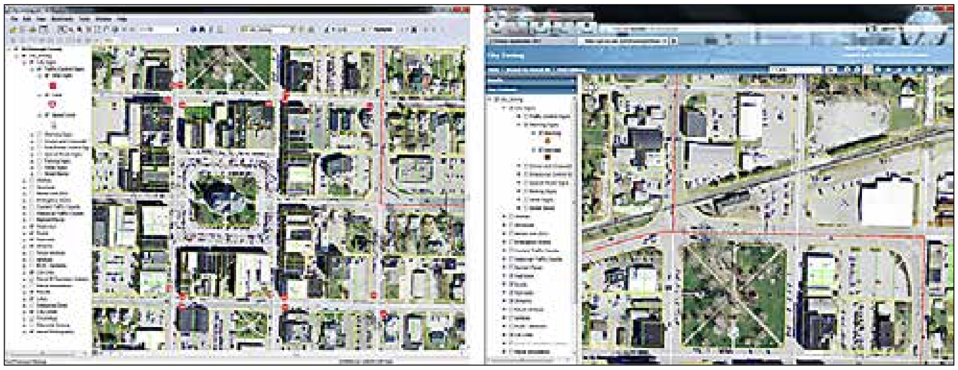


Figure 2. ArcReader and ArcGIS Server Available to Clients

Conclusions

The collected data is now available to our clients by means of ArcReader or ArcGIS Server (Fig. 2). ArcReader is for those who prefer to store the data locally and view the map even offline. ArcGIS Server is for those who have a fast Internet connection and intend to view dynamic data. The web application is a password protected and accessible through a web browser. There is also a hybrid of ArcReader and ArcGIS Server (ArcReader loads data from the map service). Some clients would like to view dynamic data but prefer the ArcReader interface.

In conclusion, there are over 5,600 features collected as of December 2012 and stored within a file geodatabase. The file geodatabase is compressed and performs better than a shapefile. We covered approximately 82 miles of streets and logged in 375 man hours for this project. Additional training of ArcReader and ArcGIS Server can be available to our clients upon request. This is a continuous project, and we are expecting sign updates from the MPWD. An open communication is the key to produce reliable and accurate data.

SPRING CONFERENCE WORKSHOPS

- URISA Certified Workshop: An Overview of Open Source GIS Software
- URISA Certified Workshop: Cartography and Map Design
- Intro to Python and Arcpy
- Polish Your Resume & Interview Skills
- Hands-on LIDAR for GIS
- Basic Surveying Practicum
- Toastmasters to the Rescue

SPRING CONFERENCE SESSIONS

- New Features and Tweaks in ArcGIS Online for Organizations
- EPA GeoPlatform
- My Boss Just told Me I'm Now the GIS Person
- GIS for Pennies
- ArcGIS Explorer Desktop
- Risk MAP: Delivering Quality Data that Reduces Risk to Life and Property
- Leveraging ArcGIS Across Your Organization
- Illinois Freedom of Information Act and GIS
- High-Accuracy GPS using Esri Workflows
- Illinois Height Modernization Program: LiDAR Data Stewardship
- Illinois Height Modernization Program: Illinois Geodetic Control
- Creating Local-Resolution Hydrography for the National Hydrography Dataset
- GIS Management from an IT Perspective
- Kankakee County Highway Portal
- Commuting Cost: Estimating the "Hidden" Cost in America's Economy
- Multi Jurisdictional GIS & Asset Management
- Using GIS to Track Air Quality
- Geographic accessibility to prenatal care

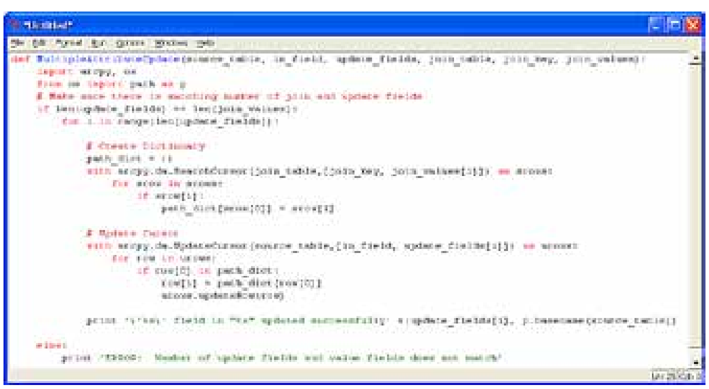
AN IMPROVED PYTHON WAY TO GET VALUES FROM ONE TABLE TO ANOTHER

By Caleb Mackey
GIS Technician, Cedar County Assessor's Office, Tipton, IA 5272

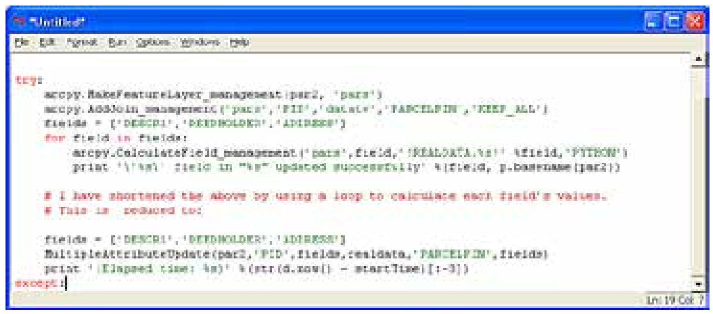
A common task I have to do as a GIS Technician working for a County Assessor's Office is to combine data from multiple tables as per the request of a customer or for different purposes such as displaying sales and assessor data for our web map services. Sure, you can join the tables in ArcMap and export them out to a new table, but you do not always need all of those attributes and you may not want to overwrite the original table. More often than not, I may only need to ***update*** some attributes from a few fields from another table.

Since many of these tables need updated on a weekly or daily basis, I would set up scripts to run as scheduled tasks during the night. It takes up many lines of code using the "Add Join and Calculate Field" methods to copy multiple fields from multiple tables because I would have to create feature layers or table views, add fields to the destination table, join the tables, and use a separate field calculator to update each field's values (update cursors do not work on joined tables). Not only was it frustrating to type all of this code just to update a few fields into the destination table, but the processing time was also very slow.

And then, I saw the light when I discovered the Python dictionary. This is exactly what it sounds like, there is a key and there is a value. Just like in the Webster's dictionary, you can look up a word (key) to find its definition (value). These Python dictionaries can be very powerful when paired with arcpy Cursors. In fact, you can completely eliminate the need to join tables in the first place (unless you want all of the attributes from a table). I have developed a tool that can update multiple fields from one table to another without even joining them. Here is the main part of the code:



With the above code I am able to supply a list of fields to be updated in the source table from the join table (even though the table is never joined). The only requirements are to have a common field (such as Parcel ID), and the same amount of fields to be updated in the source table as there are to be copied from the join table. This script will loop through the list of fields supplied by the user from the table and create a dictionary for each value field using the common field (key) while grabbing only non-null values. The dictionary is then used to feed tho other se values into the destination table on the fields where the keys match. This method is significantly faster than the "Add Join" and "Calculate Field" method. The actual code is also much shorter without having to join and calculate fields. In fact, it is reduced down to only two lines:

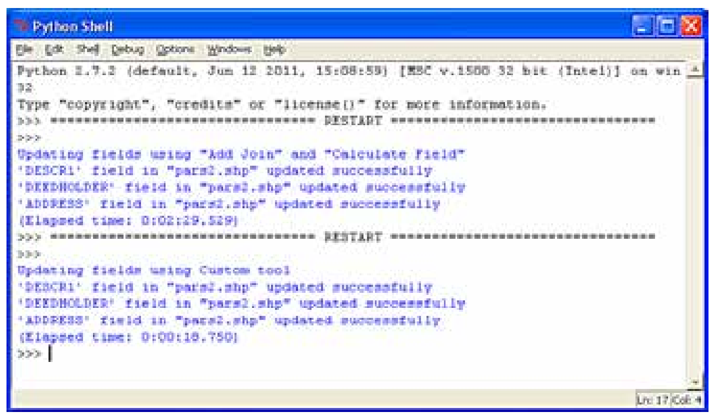


```
try:
    arcpy.MakeFeatureLayer_management(par2, 'pars')
    arcpy.AddJoin_management('pars','PID','datatv','PARCELPIN','KEEP_ALL')
    fields = ['DESCR1','DEEDHOLDER','ADDRESS']
    for field in fields:
        arcpy.CalculateField_management('pars',field,'!REALDATA.%s!' %field,'PYTHON')
        print '\'%s\' field in "%s" updated successfully' %(field, p.basename(par2))

    # I have shortened the above by using a loop to calculate each field's values.
    # This is  reduced to:

    fields = ['DESCR1','DEEDHOLDER','ADDRESS']
    MultipleAttributeUpdate(par2,'PID',fields,realdata,'PARCELPIN',fields)
    print '(Elapsed time: %s)' %(str(d.now() - startTime)[:-3])
except:
```

Here are the results (I "commented" out one section at a time to show time difference):



```
Python 2.7.2 (default, Jun 12 2011, 15:08:59) [MSC v.1500 32 bit (Intel)] on win
32
Type "copyright", "credits" or "license()" for more information.
>>> ================================ RESTART ================================
>>>
Updating fields using "Add Join" and "Calculate Field"
'DESCR1' field in "pars2.shp" updated successfully
'DEEDHOLDER' field in "pars2.shp" updated successfully
'ADDRESS' field in "pars2.shp" updated successfully
(Elapsed time: 0:02:29.529)
>>> ================================ RESTART ================================
>>>
Updating fields using Custom tool
'DESCR1' field in "pars2.shp" updated successfully
'DEEDHOLDER' field in "pars2.shp" updated successfully
'ADDRESS' field in "pars2.shp" updated successfully
(Elapsed time: 0:00:18.750)
>>>
```

It is very obvious here that the custom tool is much faster to grab field values from one table to another by using the custom tools without even needing to join them. The execution time went from 2.5 minutes down to a little over 18 seconds. The syntax is also much shorter (it could have been fit onto one really long line). Once the tool has been written as a function, the module can be imported into any other script for future use. As you can see, the Python standard library tools can be very powerful in adding extra functionality into GIS workflows and sometimes can provide a more efficient alternative to using some of the traditional ArcGIS tools.